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DATE : November 15, 2007  
SUBJECT : U.S. Patent Application Serial No. 10/690,390  
for *Full-Duplex Radio Frequency Echo Cancellation*  
Our Ref.: 40150/00301

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Attorney Docket No. 40150/00301 (1534)

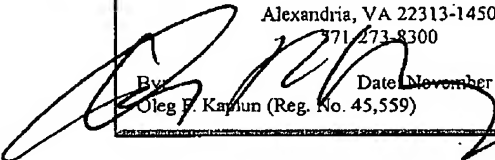
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**RECEIVED  
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Applicant(s) : Duron et al.  
Serial No. : 10/690,390  
Filed : October 21, 2003  
For : Full-Duplex Radio Frequency Echo Cancellation  
Group Art Unit : 2611  
Confirmation No. : 2375  
Examiner : Jaison Joseph

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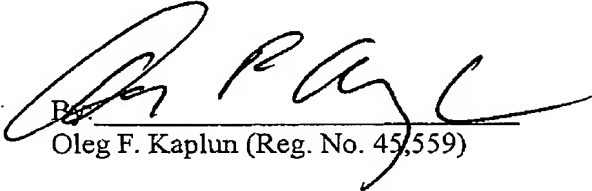
By:  Date: November 15, 2007  
Oleg F. Kaplun (Reg. No. 45,559)

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Respectfully submitted,

Dated: November 15, 2007

  
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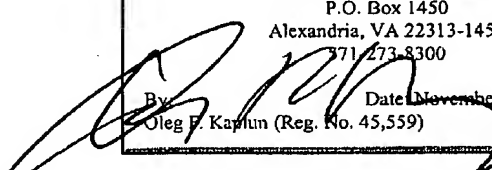
Attorney Docket No. 40150/00301 (1534)

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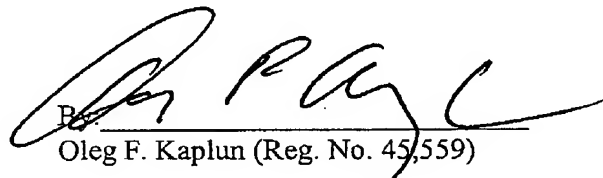
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Serial No.: 10/690,390

Attorney Docket No.: 40150/00301

Reference No.: 1534

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Application of:

**Duron et al.**

Serial No.: 10/690,390

Filed: October 21, 2003

For: FULL DUPLEX RADIO  
FREQUENCY ECHO  
CANCELLATION

Confirmation No.: 2375

Group Art Unit: 2611

Examiner: Jaison Joseph

**Board of Patent Appeals and  
Interferences**Mail Stop: Appeal Brief – Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450**APPEAL BRIEF UNDER 37 C.F.R. § 41.37**

In support of the Notice of Appeal filed on July 17, 2007, and pursuant to 37 C.F.R. § 41.37, Appellants presents this Appeal Brief in the above-captioned application.

This is an appeal to the Board of Patent Appeals and Interferences from the Examiner's final rejection of claims 1-17 and 19 in the Final Office Action dated May 2, 2007. The appealed claims are set forth in the attached Claims Appendix.

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Attorney Docket No.: 40150/00301  
Reference No.: 1534

1. Real Party in Interest

This application is assigned to Symbol Technologies, Inc., which was merged with Motorola, Inc., the real party in interest.

2. Related Appeals and Interferences

There are no other appeals or interferences that would directly affect, be directly affected, or have a bearing on the instant appeal.

3. Status of the Claims

Claims 1-17 and 19 were rejected in the Final Office Action. (See 5/2/07 Office Action). Dependent claim 18 has been determined to include allowable subject matter. (See Id.).

No amendment after final office action has been submitted.

Therefore, the final rejection of claims 1-17 and 19 is being appealed.

4. Status of Amendments

No amendment after final has been submitted.

5. Summary of Claimed Subject Matter

In the following summary, citations to reference characters or portions of the specification are not intended to limit the claims to the content of those citations. Rather, the citations are purely explanatory in nature and are not to be regarded as representing the only subject matter covered by the claims.

An exemplary embodiment of the present invention relates to the cancellation of an echo signal in an RFID system. See Abstract. The system, as recited in claim 1, includes a transmitter element (10) creating an interrogation signal and transmitting the interrogation signal. See paragraph 17 of the specification; Figure 1. The system also includes a receiver element (20) receiving a reflection signal of the interrogation signal and combining the reflection signal and a feedback signal to cancel at least a portion of radio frequency echo signals in the reflection signal. See Figures 1 and 2; paragraphs 18 and 21.

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As recited in claim 8, the present invention involves receiving a reflection signal (See paragraph 17 of the specification; Figure 1); deriving a feedback signal from the reflection signal by isolating an error component of the reflection signal (paragraphs 18 and 21); and combining the reflection signal and the feedback signal to cancel at least a portion of radio frequency echo signals in the reflection signal (paragraphs 21 and 24).

As recited in claim 10, the present invention relates to a method that involves demodulating (via demodulator 155) a reflection signal into an in-phase signal and a quadrature signal; filtering the in-phase signal to isolate an in-phase error signal (paragraph 19; Fig. 2); filtering (via a first filter 180I) the quadrature signal to isolate a quadrature error signal (paragraph 19; Fig. 2); modulating (via modulator 165) the in-phase error signal and the quadrature error signal to create a feedback signal (paragraph 21; Fig. 2); and combining (via combiner element 140) the reflection signal and the feedback signal to cancel at least a portion of radio frequency echo signals in the reflection signal (paragraph 21; Fig. 2).

As recited in claim 14, the present invention relates to a system that includes a demodulator (155) to demodulate a reflection signal into an in-phase signal and a quadrature signal (paragraph 19; Fig. 2); a first filter (180I) to isolate an in-phase error signal from the in-phase signal (paragraph 19; Fig. 2); a second filter to (180Q) isolate a quadrature error signal from the quadrature signal (paragraph 19; Fig. 2); a modulator (165) to modulate the in-phase error signal and the quadrature error signal to create a feedback signal (paragraph 21; Fig. 2); and a combiner element (140) to combine the reflection signal and the feedback signal to cancel at least a portion of radio frequency echo signals in the reflection signal (paragraph 21; Fig. 2).

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6. Grounds of Rejection to be Reviewed on Appeal

I. Whether claims 1-9 and 19 are unpatentable under 35 U.S.C. § 103(a) over U.S. Patent 6,236,315 to Helms (hereinafter "Helms") in view of U.S. Patent 4,335,214 to Levy (hereinafter "Levy").

II. Whether claims 10-17 are anticipated under 35 U.S.C. § 102(b) by Levy.

7. Argument

Claims 10-17 stand rejected under 35 U.S.C. § 102(b) as anticipated by Levy. (11/02/06 Office Action page 3). Appellants wish to focus the discussion on whether Levy really teaches combining a feedback signal with a reflection signal, or demodulating such a signal into in-phase and quadrature signals, as recited in claim 10. What is interesting about the reasoning of the Examiner is that he never identifies with any specificity what he regards as the "reflection signal" in Levy. The Examiner identifies element 36 in Levy as meeting the step of demodulating a reflection signal into in-phase and quadrature signals, so the assumption apparently underlying the rejection is that the input into element 36 ought to be regarded as meeting the recited reflection signal. If that is the case, Appellants dispute this assumption. Only one signal can rightfully be regarded in Levy as a reflection signal, namely, the signal reflected back on transmission channel 43. Indeed, the only mention of a reflection signal in Levy is when it states that "[s]purious signals also arise from indirect leakage producing delayed echoes by reflection at impedance mismatches at various points *along the transmission channel.*" Column 1, lines 30-33 (emphasis added). Nowhere else in Levy is there any mention of reflection signals, yet the Examiner has somehow convinced himself that apart from transmission channel 43, the input line into element 36 also carries a reflection signal. Such a contention is supported by not a single shred of evidence. What is being supplied into element 36 is the output of ADC 35, which in turn receives the output of subtracting circuit 34. How can these signals be

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viewed as carrying a reflection signal? The Examiner provides no answer. Unless the Examiner can provide some scientific reasoning adequately supporting his apparent assumption that the input signal into element 36 is a reflection signal, Appellants shall continue to insist that Levy does not demodulate a reflection signal into in-phase and quadrature signals.

Because claims 11-13 depend from, and therefore include all the limitations of, claim 10, these claims are also allowable.

Claim 14 recites "a demodulator to demodulate *a reflection signal* into an in-phase signal and a quadrature signal; a first filter to isolate an in-phase error signal from the in-phase signal; a second filter to isolate a quadrature error signal from the quadrature signal; a modulator to modulate the in-phase error signal and the quadrature error signal to create a feedback signal; and a combiner element to combine *the reflection signal* and the feedback signal to cancel at least a portion of radio frequency echo signals in *the reflection signal*." For same reasons discussed with reference to claim 10, this is also allowable. It is respectfully submitted that the rejection of claim 14 should be withdrawn. Because claims 15-19 depend from, and therefore include all the limitations of, claim 14, these claims are also allowable.

As for the rejection of claims 1-9, and 19 under 35 U.S.C. § 103(a) as unpatentable over by Helms in view of Levy, the Examiner admits Helms "is silent on combining the reflection signal and a feedback signal to cancel at least a portion of radio frequency signals in the reflection." (5/02/06 Office Action page 5). For the same reasons as discussed with reference to claims 10 and 14, it is respectfully submitted that the neither the Helms patent nor the Levy patent, either alone or in combination, discloses or suggests demodulating a reflection signal into in-phase and quadrature signals. It is respectfully submitted that claim 1 and claim 8 and all



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claims depending therefrom are allowable and the rejection under 35 U.S.C. § 103 should be  
withdrawn.

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Attorney Docket No.: 40150/00301  
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8. Conclusion

For the reasons set forth above, Appellants respectfully request that the Board reverse all the rejections of the pending claims.

Respectfully submitted,

Date: November 15, 2007

  
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**CLAIMS APPENDIX**

1. (Original) A system, comprising:  
  
a transmitter element creating an interrogation signal and transmitting the interrogation signal; and  
  
a receiver element receiving a reflection signal of the interrogation signal and combining the reflection signal and a feedback signal to cancel at least a portion of radio frequency echo signals in the reflection signal.
2. (Original) The system according to claim 1, wherein the feedback signal is derived by isolating an error component of the reflection signal.
3. (Original) The system according to claim 2, wherein the error component of the reflection signal is isolated in one of an in-phase signal and a quadrature signal.
4. (Original) The system according to claim 2, wherein the error component of the reflection signal is isolated by filtering the reflection signal.
5. (Original) The system according to claim 4, wherein the feedback signal is combined with the reflection signal within an impulse response time of a filtering element which is filtering the reflection signal.
6. (Original) The system according to claim 1, wherein the reflection signal is reflected by a radio frequency tag.
7. (Original) The system according to claim 1, wherein the feedback signal is derived through one of analog processing and digital processing.
8. (Original) A method, comprising the steps of:  
  
receiving a reflection signal;

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deriving a feedback signal from the reflection signal by isolating an error component of the reflection signal; and

combining the reflection signal and the feedback signal to cancel at least a portion of radio frequency echo signals in the reflection signal.

9. (Original) The method according to claim 8, wherein the error component of the reflection signal is isolated in one of an in-phase signal and a quadrature signal.

10. (Original) A method, comprising the steps of:

demodulating a reflection signal into an in-phase signal and a quadrature signal;

filtering the in-phase signal to isolate an in-phase error signal;

filtering the quadrature signal to isolate a quadrature error signal;

modulating the in-phase error signal and the quadrature error signal to create a feedback signal; and

combining the reflection signal and the feedback signal to cancel at least a portion of radio frequency echo signals in the reflection signal.

11. (Original) The method according to claim 10, wherein the filtering steps include one of low pass filtering, band pass filtering and high pass filtering.

12. (Original) The method according to claim 10, further comprising the step of:  
amplifying the feedback signal prior to the combining step.

13. (Original) The method according to claim 10, further comprising the steps of:  
converting the in-phase signal and the quadrature signal from an analog signal to a digital signal; and

converting the in-phase error signal and the quadrature error signal from a digital signal to an analog signal.

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14. (Original) A system, comprising:
- a demodulator to demodulate a reflection signal into an in-phase signal and a quadrature signal;
  - a first filter to isolate an in-phase error signal from the in-phase signal;
  - a second filter to isolate a quadrature error signal from the quadrature signal;
  - a modulator to modulate the in-phase error signal and the quadrature error signal to create a feedback signal; and
  - a combiner element to combine the reflection signal and the feedback signal to cancel at least a portion of radio frequency echo signals in the reflection signal.
15. (Original) The system according to claim 14, wherein the first and second filters are one of a low pass filter, a band pass filter, a high pass filter and a base-band digital radio.
16. (Original) The system according to claim 14, wherein the combiner element is one of a radio frequency splitter and a directional coupler.
17. (Original) The system according to claim 14, further comprising:
- an amplifier to amplify the feedback signal before input into the combiner element.
19. (Original) The system according to claim 14, further comprising:
- a third filter to filter the feedback signal before input into the combiner element

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**EVIDENCE APPENDIX**

No evidence has been submitted herewith or is relied upon in the present appeal.

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**RELATED PROCEEDINGS APPENDIX**

There are no related proceedings or decisions that relate to the present appeal.